and subsequently by telephone. Outcome measures and 48 months of age, in home visits at 3 and 15 months entered by study nurses at recruitment and 3, 15, 24, 36, and 48 months, covering the period since birth or the previous visit. Analyses were limited to outcomes at 15 months (covering the recall period from birth to 15 months) and at 4 years (covering the recall period from 3 to 4 years). Atopy was defined as >1 positive skin-prick test result at 15 months of age with a panel of common inhalant and food antigens.

CONCLUSIONS. In a cohort of children at high risk, there were no associations of antibiotic use in the first year of life with later development of atopic disease.

REVIEWERS COMMENTS. As the interest of the general public in an anthroposophic lifestyle increases, providers continue to have a responsibility to provide optimal care, which includes prescribing antibiotics when they are clinically indicated in the interest of preserving the greater health of the child. Despite a small sample size and lack of randomization, this study reinforces that early antibiotic use is not associated with increased development of atopy. However, children with atopy, particularly asthma, may be more likely to receive antibiotics in the first year of life.

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Kanwaljit K. Chawla, MD
Anna Nowak-Wegrzyn, MD
New York, NY

The Association of Early Life Exposure to Antibiotics and the Development of Asthma, Eczema and Atopy in a Birth Cohort: Confounding or Causality?

PURPOSE OF THE STUDY. The goal was to examine the association between antibiotic exposure in infancy and the development of asthma, eczema, and atopy in early childhood. A secondary goal was to determine whether the association is secondary to confounding chest infections in infancy.

STUDY POPULATION. Expectant mothers were recruited from a random sample of midwives in 2 major New Zealand cities between 1997 and 2001; full details on the non-responding mothers are incomplete.

METHODS. This was a birth cohort study that collected reported antibiotic exposure before 3 months and before 15 months, along with outcomes (wheeze, asthma, eczema, rash, and inhaler use) at 15 months (N = 1011) and 4 years (N = 986). Questionnaires were administered by study nurses at recruitment and 3, 15, 24, 36, and 48 months of age, in home visits at 3 and 15 months and subsequently by telephone. Outcome measures were collected by using identical questions at 15, 24, 36, and 48 months, covering the period since birth or the previous visit. Analyses were limited to outcomes at 15 months (covering the recall period from birth to 15 months) and at 4 years (covering the recall period from 3 to 4 years). Atopy was defined as >1 positive skin-prick test result at 15 months of age with a panel of common inhalant and food antigens.

RESULTS. Antibiotic exposure before 3 months was significantly associated with asthma developing between birth and 15 months (odds ratio [OR]: 2.32 [95% confidence interval [CI]: 1.5–3.7]; P = .0004); however, with adjustment for chest infections (univariate analysis), this association was reduced (OR: 1.6 [95% CI: 0.96–2.60]) and only trended toward statistical significance (P = .07). Multivariate analysis (with adjustment for gender, ethnicity, family history, parity, otitis media, and antibiotic use between 15 months and 4 years) further decreased this association (OR: 1.3 [95% CI: 0.8–2.2]; P = .4). Similarly, although the association of antibiotics with atopy initially trended toward statistical significance (OR: 1.44 [95% CI: 0.96–2.14]; P = .08), the association was reduced after adjustment for chest infections (OR: 1.36 [95% CI: 0.91–2.05]; P = .14). There was no effect of antibiotic exposure before 15 months on asthma developing after 15 months and remaining present between 3 and 4 years (OR: 1.4 [95% CI: 0.9–2.1]; P = .20). Antibiotic exposure before 3 months was not significantly associated with eczema and rash developing between 0 and 15 months, but exposure before 15 months was significantly associated with both eczema (OR: 1.8 [95% CI: 1.1–3.1]; P = .02) and rash (OR: 1.6 [95% CI: 1.02–2.53]; P = .04) developing after 15 months and remaining present at 4 years; however, these associations also lost statistical significance with both univariate and multivariate analyses.

CONCLUSIONS. There is a statistically significant association between antibiotic exposure in infancy and the subsequent presence of asthma and eczema; however, these associations lose statistical significance with adjustment in univariate and multivariate analyses. The effect of antibiotics on respiratory disease may be a result of confounding by chest infections at an early age when asthma may be indistinguishable from infection.

REVIEWERS COMMENTS. Increases in both asthma prevalence and use of antibiotics in recent years have led some to postulate connections between the 2. Retrospective studies in general have shown strong associations between early antibiotic use and the symptoms of asthma, although these associations have been weaker in prospective studies. Reverse causation as an explanation has been suggested by some (ie, people with asthma may tend to have more respiratory infections that require treatment with antibiotics). This study was limited by a
lack of data regarding the reason for early antibiotic use, but it suggests that much of the effect of antibiotics on respiratory disease is a result of the confounding effects of early chest infection. More prospective studies are needed to better illuminate this complex association.

Association Between Obesity and Atopy in Chinese Schoolchildren
Leung TF, Kong APS, Chan HIS, et al. *Int Arch Allergy Immunol.* 2009;149(2):133–140

**PURPOSE OF THE STUDY.** To investigate the association between asthma traits, atopy, and obesity-related markers in Chinese adolescents.

**STUDY POPULATION.** Chinese children (N = 486) who were randomly selected from a Hong Kong obesity study of adolescents had their allergy features assessed.

**METHODS.** Anthropometric measurements were made, with BMI greater than local age- and gender-specific 85th percentile defining overweight and BMI greater than 95th percentile defining obesity. Fasting blood samples were collected to measure levels of allergen-specific immunoglobulin E (to dust mite, cat, and cockroach), lipids, and inflammatory biomarkers.

**RESULTS.** The median age was 15.0 years (interquartile range: 14.0–16.0 years), and the median BMI was 19.3 kg/m² (interquartile range: 17.5–21.7 kg/m²). There were 62 overweight children (12.8%) and 36 obese children (7.4%). There were 239 atopic subjects (49.2%). Neither overweight nor obesity status was associated with asthma, allergic rhinitis, or eczema (P > .25). Atopy was also not associated with age-adjusted BMI, waist circumference, serum lipid profiles, or fasting glucose levels. Atopy and presence of allergen-specific immunoglobulin E did not differ between overweight or obese children and those with normal BMI (P > .25). Subgroup analysis suggested that cockroach sensitization was more common among boys who were obese or overweight (P = .045). The white blood cell (WBC) count was significantly higher among atopic versus nonatopic children (mean: 6.5 × 10⁹ vs 6.2 × 10⁹ cells per L; P = .006). Logistic regression revealed higher WBC count to be a risk factor for atopy (odds ratio: 18.97; P = .004).

**CONCLUSIONS.** Obesity is not associated with asthma or atopy. A high WBC count is an important risk factor for atopy in boys and girls. Gender does not exert any consistent effect on the association between obesity and allergy sensitization in children.

Association of Obesity With IgE Levels and Allergy Symptoms in Children and Adolescents: Results From the National Health and Nutrition Examination Survey 2005–2006

**PURPOSE OF THE STUDY.** To study the association of obesity with total and allergen-specific immunoglobulin E (IgE) levels and allergy symptoms in children and adolescents.


**METHODS.** Eligible persons who completed both the household interview and medical examination components of the National Health and Nutrition Examination Survey and had height and weight measured were included in the study. Total serum IgE and allergen-specific IgE tests were performed depending on age. Atopy was defined as a positive response (≥0.35 kU/L) to ≥1 of the allergens tested. BMI was calculated for all study participants, and detailed questions regarding physical activity, household smoking, maternal smoking during pregnancy, and birth weight were asked.

**RESULTS.** Total serum IgE levels were higher among overweight and obese children versus normal-weight children, unrelated to smoking exposure, birth weight, or physical activity. The odds ratio for atopy was increased for the obese children, compared with normal-weight children. Most of the children with atopy were sensitized to foods, and there was no association seen between obesity and reported allergy symptoms and hay fever.
The Association of Early Life Exposure to Antibiotics and the Development of Asthma, Eczema and Atopy in a Birth Cohort: Confounding or Causality?

Stephen E. Scranton and Karla L. Davis

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